

**THE PATH TO**

*Sheet metal*

**PERMANENCE**



**TONCAN  
IRON**



R E P U B L I C

S T E E L

C O R P O R A T I O N







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REPUBLIC STEEL CORPORATION

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GENERAL OFFICES • CLEVELAND, OHIO



# The Path to *Permanence*

● For the metallurgists of Republic Steel Corporation, there are no stoplights along the path to sheet metal permanence. The search for a better sheet metal goes everlastingly on.

Republic's leadership in the field of sheet metal is not embodied in the person of a lone metallurgist who "hit upon something." It is, rather, the result of unceasing efforts of a corps of technical experts to perfect a metal which offers greater rust-resistance, better working qualities, added economies to its users.

Plain carbon steel sheets, copper-bearing steel sheets, pure iron sheets, copper-bearing iron sheets, stainless steel sheets—Republic Steel Corporation makes all of them to fill certain needs in industry. But there also exists an undeniable need for a highly rust-resistant sheet for severe service, yet one which falls within the accepted price range. This is a need which only Republic, manufacturer of the widest range of sheet metals, can fill. For only Republic makes Toncan Iron.

Republic's metallurgists never have been, and never will be, hidebound by tradition. They know too well the advantages of "agreeing to disagree," of making independent investigations and isolated tests, of trying new combinations of materials and new manufacturing methods, of studying results in customers' plants as well as in Republic's modern research laboratories.

Underlying the varied activities of these men is one basic objective—the continuous development of a better sheet metal which will carry its users further along the path towards sheet metal permanence. Such a metal is Toncan Iron.





# Why Toncan Iron was developed

● Toncan Iron is a scientifically refined open hearth iron with which copper and molybdenum are alloyed in the correct proportion. It is a metal originated and manufactured to possess one fundamental utility in particular—that of resistance to rust.

Toncan Iron was first made twenty-nine years ago, at a time when industry was gravely concerned over the tremendous annual loss of iron and steel through rusting—a yearly loss which has been estimated by leading authorities to exceed three billion dollars.

When first manufactured, Toncan Iron was a highly refined iron, unalloyed with other elements and containing a minimum of rust-promoting impurities. The changes which followed through the intervening years came not as the result of whim or guess but of well-laid plans, relentless research, and the most exacting tests. Copper was alloyed with iron to form a new iron-copper alloy which was more resistant to

rust than the original iron. Later, it was demonstrated that the element molybdenum, when correctly combined, even in fractional percentages, with well-made iron and copper, produced an iron-copper-molybdenum alloy with a degree of resistance to rust and corrosion never before attained commercially. For molybdenum makes the increased copper content many times more effective.

It has been proved emphatically that the addition of either copper or molybdenum will not contribute its full individual properties to iron. Only through the addition of both copper and molybdenum, in the correct proportion, are the full individual properties utilized.

Such is the Toncan Iron of today—an open hearth iron refined to reasonable limits in which not less than .40 per cent copper and .05 per cent molybdenum are uniformly dissolved—a ferrous alloy with maximum resistance to rust among ferrous materials in its price class.

All products made by Republic Steel Corporation must run a gantlet of tests in the metallurgical laboratories. The metallurgist shown here is analyzing the grain structure of a mounted, polished, and etched sample.





# What Toncan Iron offers its users

• In thousands of laboratory and weather tests, and in countless service tests conducted for three decades in practically every industry, Toncan Iron conclusively has proved its possession of eight outstanding advantages. These are, briefly:

1. It resists, to a higher degree than any other ferrous material in its price class, the attacks of natural forces which cause rust and corrosion.

2. Its high resistance to rust and corrosion is not confined to the surface or skin of the metal. Toncan Iron is uniformly resistant throughout its entire cross-section.

3. It combines with the high rust-resistance of an alloy iron many desirable physical qualities not found in the highest grade open hearth steels.

4. It is one of the most ductile of materials. It is remarkably soft. It forms easily.

5. Unlike other ferrous materials, cold working—cutting, bending, punching, stamp-

ing, drawing, etc.—has practically no effect upon the rust-resistance of Toncan Iron.

6. It welds easily by any of the usually accepted modern methods. The use of Toncan Iron Welding Rod insures an installation of equal rust-resistance throughout.

7. A uniform and tightly adherent galvanized coating can be applied, thus adding the protection of a coating of zinc to the already high rust-resistance of the base metal itself.

8. Through its longer service life, it has been found to cost far less per year of service. Its use is more than an economy. It is insurance against early sheet failures and frequent, costly replacements.



# How Rust is Formed

● Rust, in technical terms, is iron oxide, a combination of iron and oxygen. Iron and oxygen will not combine directly except by the application of heat of at least 400 degrees Fahrenheit, in which case scale, or iron oxide, is formed on articles of iron or steel. Because such temperatures are not normally found in practice, it is evident that nature forms iron oxide indirectly in two distinct stages:

1. (Solution) The iron dissolves.
2. (Oxidation) Oxygen unites readily with the dissolved iron to form rust.

All forces—whether of atmosphere, raw materials, or products of industry—that attack iron or steel do so through electrochemical solution of the iron and then, in the presence of oxygen, precipitate iron oxide, or rust.

## ... and how Toncan Iron combats it

● Toncan Iron is a rust-resistant ferrous material chiefly because it is an alloy of iron, copper, and molybdenum—the alloy that possesses the most inherent resistance to solution, and hence to rust, of any commercial ferrous material in its price class—the alloy that is most noble, and hence most rust-resistant.

Toncan Iron is rust-resistant also because it is chemically uniform. Chemical uniformity is essential for maximum rust-resistance, as otherwise chemical differences would create electropotential differences which hasten the rate of solution in a harmfully localized and selective manner. Skillful alloy practice, combined with years of experience, produces this alloy with a perfection of chemical uniformity

never before considered practicable.

Furthermore, Toncan Iron is structurally uniform. The proper combination of the alloying elements, copper and molybdenum, under the influence of proper furnace and rolling practice, creates and maintains a fine equiaxed grain structure which contributes additional rust-resistance.

It should be pointed out that under conditions favoring rust formation, a protective film may be found on the surface of Toncan Iron. This film is not of the loose, flaky type usually associated with rusted metals but is darker, more inert, denser and more adherent. It is, in fact, so adherent that it actually protects the uncorroded surface beneath it.



# Toncan Iron is easy to form . . .

- Toncan Iron is exceedingly ductile, and can be formed into any commodity ordinarily made of sheet steel or iron. It is much softer than mild steel, and, because of its workability, it can be deep drawn, formed, bent, flanged, stamped, or spun. Toncan Iron Sheets are joined more easily than other ferrous materials by single, double and Pittsburgh lock seams—with perfect adherence of the galvanized coating. It is easy to cut or shear and requires less power and less labor for working.

Because of this desirable two-fold property of ductility and softness, it is unnecessary to do anything to this alloyed open hearth iron to make it work and perform satisfactorily. Occasionally, however, experience may dictate the need of heat-treatment after severely working the material in heavy gauges.

Toncan Iron can be annealed at a temperature of from 1,200 to 1,250 degrees Fahrenheit, to relieve strains caused by working, and can be normalized at a temperature of 1,700 degrees Fahrenheit, followed by cooling in air to improve the grain structure of the iron after working. It can be welded, soldered, brazed, riveted, etc., and may be protected with various coatings or galvanized, galvannealed, sherardized, etc.

One of the most distinctive characteristics of Toncan Iron is its sustained rust-resistance despite cold-working or deformation. Other commercial ferrous sheet materials ordinarily first dissolve and rust most rapidly at, or adjacent to, parts which have been cold-worked, such as seams, cut ends, bends, and punched holes. The rust-resistance of Toncan Iron remains practically unaffected by such operations.

## and has excellent welding properties

- The excellent welding properties and smooth-flowing behavior of Toncan Copper Molybdenum Iron are common knowledge to the welding fraternity. The use of

Toncan Iron welding wire for gas welding and flux-coated rod for electric welding insures a completed job of uniformly high resistance to rust and corrosion throughout.



Preparing to weld Toncan Iron tubes for the economizer section of a warm air system to be installed by E. K. Campbell Heating Co., Kansas City, Mo.



# Physical properties and physical constants

• Toncan Iron is unique in that it combines with its remarkable rust- and corrosion-resistance physical properties not found in the best grades of open hearth steel.

Many of these properties are due to the alloy addition of molybdenum. This element entirely dissolves without loss in the iron and yields a positive and beneficial effect. It produces a grain refinement which results in an improvement in strength and ductility, as well as greater rust-resistance. It increases the ability of the metal to withstand shock. It increases the suscep-

tibility of the metal to heat treatment. It increases the elastic ratio; that is, the ratio between elastic limit and tensile strength.

These properties combine to yield most satisfactory forming, bending and drawing properties and, coupled with superior rust-resistance, give to Toncan Iron a well earned recognition in most of the sheet metal specifications of today.

These physical properties are reflected in the accompanying figures, showing a range for all Toncan Iron products.

## PHYSICAL CONSTANTS

Weight.....	.283 lb./cubic inch.
Specific gravity, 7.88, or approximately that of ordinary iron or steel.	
Melting point.....	2,775 degrees Fahrenheit.
At room temperature (20 degrees Centigrade, or 68 degrees Fahrenheit):	
Electrical resistivity, eight times that of copper, or approximately .0000137 ohm/cm. cube = 13.7 microhm/cm. cube = 77 ohm/circular mil foot.	
Electrical conductivity, 12½ per cent that of copper, or approximately 73,000 reciprocal ohm/cm. cube = .013 mho/circular mil foot.	
Thermal conductivity, slightly better than iron or steel, or approximately .18 cal/cm. cube/sec/degree Centigrade = .7 Watt/cm. cube/sec/degree Centigrade.	
Linear coefficient of thermal expansion, .0000121 cm./cm./degree Centigrade, 0-100 degrees Centigrade = .00000674 inch/inch/degree Fahrenheit, 32-212 degrees Fahrenheit.	

## PHYSICAL PROPERTIES

Ultimate strength, lbs./sq. in. - - - - -	48,000—58,000
Elastic limit, lbs./sq. in. - - - - -	32,000—40,000
Elongation in 2", per cent - - - - -	32—40
Elongation in 4", per cent - - - - -	26—32
Elongation in 8", per cent - - - - -	24—30
Reduction of area, per cent - - - - -	56—75
Rockwell Hardness, B Scale - - - - -	38—46 (annealed)
Rockwell Hardness, B Scale - - - - -	46—60 (cold-rolled)



# Toncan Iron Sheets

## FORMS AND FINISHES

Black and galvanized flat sheets in all the usual gauges, corrugated the long way of the sheet; corrugated, pressed standing seam roofing; two, three,

and five V-crimped roofing, roll roofing, ridge rolls, and a variety of pressed siding patterns; galvanized, oven-lined, and terne coated. (See page 20.)

## SIZES AND GAUGES

### CORRUGATED SHEETS

COMMERCIAL GALVANIZED AND SPECIAL TIGHT COAT, as well as formed roofing products. 12 to 28 U. S. Gauge, inclusive. Width range, 24" to 48". Length, 60" to a maximum of 144".

HOT-ROLLED SHEETS—7 to 16 U. S. Gauge, inclusive. Width range, 24" to 60". Length, 60" to a maximum of 180".

HOT-ROLLED AND ANNEALED SHEETS—17 to 26 U. S. Gauge, inclusive. Width range, 24" to 60". Length, 60" to a maximum of 144".

HEAVY COLD ROLLED AND LIGHT COLD ROLLED. 7 to 24 U. S. Gauge, inclusive. Width range, 24" to 63". Length, 60" to a maximum of 120".

LONG TERNES—14 to 28 U. S. Gauge, inclusive. Width range, 24" to 49". Length, 60" to a maximum of 144".

TONCAN IRON OVEN LINING AND TONCAN IRON GALVANNEALED—Gauges 16 to 28, inclusive. Widths up to 54". Lengths to 144".

### CORRUGATED ROOFING AND SIDING—

(a) Galvanized—Present standard widths and corrugations. In all lengths, 5' 0" to 12' 0" in 28 gauge and heavier.

(b) Painted —Present standard widths and corrugations. In all lengths, 5' 0" to 12' 0" in 26 gauge and heavier, even gauges.

# Toncan Iron Plates

Toncan Iron Plates meet an insistent demand for heavy, rust-resisting plates, to give trouble-free service and long life. Fireboxes, bridge decks, blast plates, stacks, tanks, large fabricated plate pipe, furnaces, and hoppers are a few of industry's many uses for Toncan Iron Plates.

# Toncan Iron Strip

Hot-rolled Toncan Iron Strip is available in widths from 3½ inches to 36 inches. Through special arrangements, it can be made in widths narrower than 3½ inches, in which case the lightest limit is 16 gauge.

The lightest gauge in which cold-rolled Toncan Iron Strip is offered is 22 gauge. It is available in all widths.



# SIZES . . . Toncan Iron Sheets

Rolling limits of Toncan Iron in black, galvanized, blue-annealed, and special finishes are indicated in this reference table, with the exception that Black Toncan is not made lighter than 26 gauge, while galvanized sheets are not supplied in greater length than 144 inches or greater width than 48 inches.	GAUGE	LENGTH IN INCHES																		
	WIDTH	24"	26"	28"	30"	32"	34"	36"	38"	40"	42"	44"	46"	48"	50"	52"	54"	56"	58"	60"
	No. 28.....	144	144	144	144	144	144	144	144	120										
	No. 27.....	144	144	144	144	144	144	144	144	120	120									
	No. 26.....	144	144	144	144	144	144	144	144	144	144	120	120	120						
	Nos. 25 and 24...	144	144	144	144	144	144	144	144	144	144	144	144	120	120					
	No. 23.....	144	144	144	144	144	144	144	144	144	144	144	144	120						
	Nos. 22 and 21...	144	144	144	144	144	144	144	144	144	144	144	144	144						
No. 20 and heavier	144	144	144	144	144	144	144	144	144	144	144	144	144	120	120	120	120	120	120	

## Toncan Iron Plates

Thickness	WIDTHS AND LENGTHS (INCHES)																				Thickness	Diameter of circles (inches)	
	24	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144			150
No. 10 BWG	384	360	384	384	300	276	252	240														No. 10 BWG	72
No. 9 BWG	384	384	384	384	360	300	300	300														No. 9 BWG	78
No. 8 BWG	444	480	480	480	480	420	396	360	324													No. 8 BWG	84
3-16"	480	480	480	480	480	480	480	420	384	360	336	300	240	224	212							3-16"	120
1-4"	480	480	480	480	480	480	480	480	480	444	414	396	372	360	324	312	300	252	240	216		1-4"	148
5-16"	480	480	450	490	500	490	480	480	480	480	480	444	444	420	420	396	360	300	240			5-16"	150
3-8"	410	450	510	550	580	580	580	550	520	500	480	440	400	380	360	350	330	310	300	270	210	3-8"	150
7-16"	410	460	550	620	640	640	640	600	600	600	500	450	450	430	400	400	380	360	340	320	240	7-16"	150
1-2"	410	460	580	630	640	640	640	640	640	640	640	540	540	520	520	480	460	440	420	400	240	1-2"	150
9-16"	410	460	580	640	640	640	640	640	640	640	640	540	540	540	520	480	480	440	420	380	240	9-16"	150
5-8"	410	460	580	640	640	640	640	640	640	640	640	550	540	540	520	480	450	420	400	370	240	5-8"	150
11-16"	410	460	580	640	640	640	640	640	640	640	640	600	600	540	520	480	450	420	400	370	230	11-16"	150
3-4"	410	460	580	640	640	640	640	640	640	640	640	600	600	540	520	480	450	420	400	370	230	3-4"	150
7-8"	410	460	580	640	640	640	640	640	640	640	600	550	550	530	510	460	450	420	400	370	220	7-8"	150
1"	410	450	580	640	600	600	600	600	600	600	550	550	550	530	510	460	450	420	400	370	210	1"	150
1 1-8"	410	450	580	610	580	550	550	550	550	550	550	520	500	480	430	400	370	350	330	210		1 1-8"	152
1 1-4"	410	450	540	520	520	520	520	520	520	510	500	500	500	500	480	430	400	370	350	330	200	1 1-4"	152
1 3-8"	200	350	470	480	520	520	520	520	520	490	480	480	480	480	460	420	390	360	340	320	190	1 3-8"	152
1 1-2"	200	200	450	460	500	500	500	460	430	470	440	440	440	440	440	420	390	360	340	320	190	1 1-2"	152
1 3-4"	200	200	430	440	480	480	460	420	400	450	380	360	420	420	410	400	360	360	330	300		1 3-4"	150
2"	200	200	400	400	400	400	370	350	350	360	340	320	400	390	370	350	330	320	310	300		2"	150

NOTE: If widths and lengths other than those above are required, tell us your requirements. Special sizes are run to specifications.

### How to specify Toncan Iron Sheets

Toncan Iron Sheets are stocked by jobbers in all large cities. Be sure to specify: "All sheet metal work shall be rust-resisting Toncan Copper Molybdenum Iron manufactured by Republic Steel Corporation." In cases where public institutions do not use trade-names in specifications, Toncan Iron Sheets may be specified as: "Alloyed iron sheets of open hearth iron, copper and molybdenum produced by the basic open hearth process, containing no

less than .40 per cent copper and .05 per cent molybdenum."

For your protection, every Toncan Iron galvanized sheet is stenciled at approximately two-foot intervals with the Toncan Iron trade-mark in green. Smaller formed products are die stamped with the trade-mark and maker's name. The gauge also is clearly shown.

Look for the green Toncan Iron trade-mark—it's your assurance of longer sheet life, easier working quality, and greater economy.

The following pages answer the question:

WHO USES TONCAN IRON?

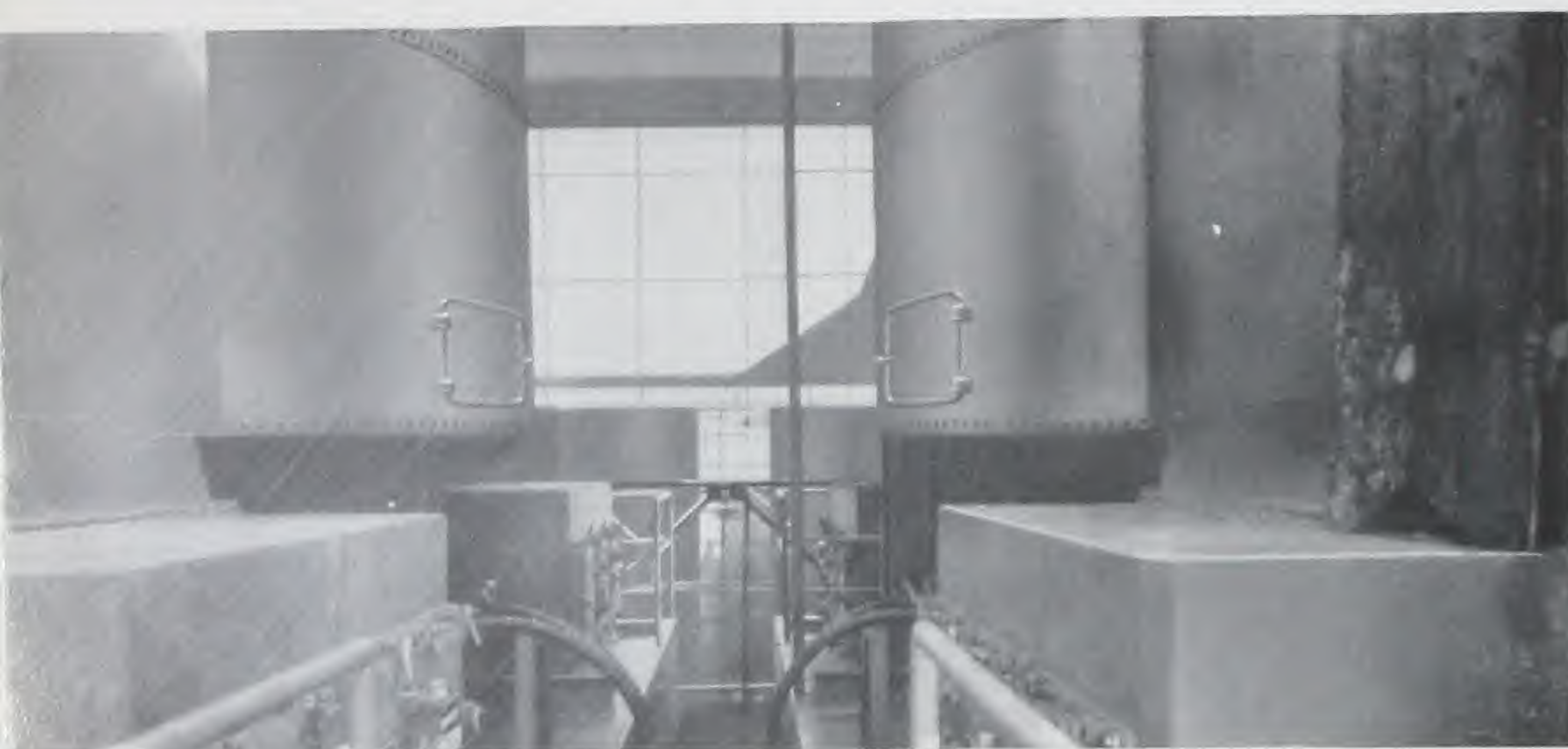




At mammoth Soldier Field, in Chicago, a quantity of Toncan Iron sheets has been used. The most recent application of Toncan Iron has been the roofs of ten ticket booths.



Toncan Iron was used for all interior sheet metal work in the Seattle Art Museum. Architects, Bebb & Gould; consulting engineer, Louis Bouillon; general contractor, Peter J. Gjarde; fabricator, Washington Sheet Metal Works. All are Seattle firms.



Toncan Iron was used for the precipitators of the smoke-elimination device at the central heating plant, Washington, D. C., which supplies heat for all government buildings. Fabricators: Wepsco Steel Products Co., Blue Island, Ill.; Pausin Engineering, Newark, N. J.; Lackawanna Steel Construction Co., Buffalo, N. Y. Consultant: The Research Corp., Bound Brook, N. J. Engineers: The United Engineers and Construction Co., Philadelphia, Pa. General contractor: Eastern Construction Co., New York.



Toncan Iron Plates were used to form the mains in the new sewer system for the city of Anderson, Ind. Architect, Chas. Brossman; general contractor, T. P. Kelly & Sons.

# Architects

After devoting months, even years, to the creation and design of a beautiful building or other structure, the conscientious architect seeks means of endowing it with permanence, by specifying those materials which will best meet his client's service requirements.

Toncan Iron brings to the building industry the highest degree of resistance to rust and corrosive action obtainable in ferrous sheet metal to be found in its price class. It also insures economy of installation, through its unsurpassed ductility and working qualities. The truth of every claim made for Toncan Iron as to its durability, economy, and other superior merits is attested by many of America's leading architects.

# Engineers

Toncan Iron, because of its versatility, has been given wide usage by engineers and has proved its value on countless installations under severe service conditions.

Engineers use Toncan Iron for roofing, siding, and all other exterior applications called for in the specifications. Heating and ventilating engineers specify Toncan Iron for all sheet metal work in heating and ventilating installations. It is an ideal material for water line mains, etc. Maintenance engineers, mechanical engineers—in short, all types of engineers who are concerned with the unending battle of industry against the forces of rust specify Toncan Iron for sheet metal work.

Scattered throughout the following pages are a few of the many uses for which engineers specify Toncan Copper Molybdenum Iron, the sheet metal that continues to build new records of rust-resistance, endurance, and economy with each passing year of service.



## SHEET METAL

# Contractors

To the sheet metal contractor, Toncan Iron brings unusual ductility and easy working properties. It is much softer than mild steel, a fact which enables sheet metal shops to make a neater job and to save money on labor costs, an item which usually represents a major portion of the total cost of sheet metal jobs. And the bright, galvanized surface of Toncan Iron lends itself to forming just as readily as the soft material beneath it.

Toncan Iron builds reputations for sheet metal contractors. As the most rust-resistant ferrous material in its price class, it lasts longer and brings customers back with repeat business at a minimum of selling expense to the contractor. And its small additional cost, measured as a portion of the total cost of sheet metal jobs, invariably proves to be a wise investment.



Roofing the storage warehouse of the Walnut Growers Association at Huntington Park, Calif., with Toncan Iron corrugated sheets. Architect, Albert C. Martin; general contractor, Kubach & Snyder; fabricator, Foss Heating & Ventilating Co.; subcontractors, Ducommun Corp., and Union Hardware & Metal Co.

Covering the dome of the County Courthouse at Peoria, Ill., with Toncan Iron Sheets. The fabricator on this installation was F. Meyer & Bro. Co., Peoria.



Toncan Iron Sheets are used for the steamjacket of this pasteurizer, known as the "Univat." It is manufactured by Cherry-Burrell Corp., Chicago.

Ward Heater Co., Ltd., Los Angeles, Calif., is the manufacturer of this floor furnace. Toncan Iron Sheets have proved most satisfactory because of their resistance to corrosion.



# Manufacturers

Sheet metal and plates are vital parts of thousands of products on the market today. Washing machines, refrigerators, stoves, truck bodies, and boats are a few of the more common examples.

To the manufacturing industry, few sales features can be more attractive than those offered by Toncan Copper Molybdenum Iron, with its permanence, durability, and other notable qualities stressed in convincing, aggressive advertising campaigns in many industries.

Toncan Iron has been the means of improving many of the world's most famous products, and also, because of its easy-working qualities, has proved an important cost-cutting material for the manufacturer.





# Institutions

When Old Dartmouth Hall, at Dartmouth College, Hanover, N. H., was badly damaged by fire, Toncan Iron was used for all sheet metal replacements. Architects, J. Friedrich Larson; general contractor, W. H. Trumbull. The subcontractor was Hahnel Bros., Lewiston, Me.



Reroofing and guttering of St. Mary's Hospital, Quincy, Ill., is of Toncan Iron Sheets. Fabricator, A. J. Newman, of Quincy. It was the premature failure of other materials which prompted the hospital trustees to specify the slightly higher priced Toncan Iron for long life.

A quantity of Toncan Iron Sheets has been used in the beautiful Woodworth School, located at Dearborn, Michigan. Architect, C. R. Jenson; general contractor, Patterson Engineering Co.; fabricator, American Blower Co.



The McDonald Observatory of University of Texas, located at Mt. Locke, Texas, houses the second largest telescope in the world. Both inside and outside of the building are lined with Toncan Iron Sheets. Designer, Warner & Swasey Co.; fabricator, Patterson-Leitch Co., Cleveland, Ohio. The subcontractor was Samuel Dean, San Antonio, Texas.



For the Soldiers and Sailors Memorial at Trenton, N. J., Toncan Iron was specified by the architect, Louis Kaplan, of Trenton.



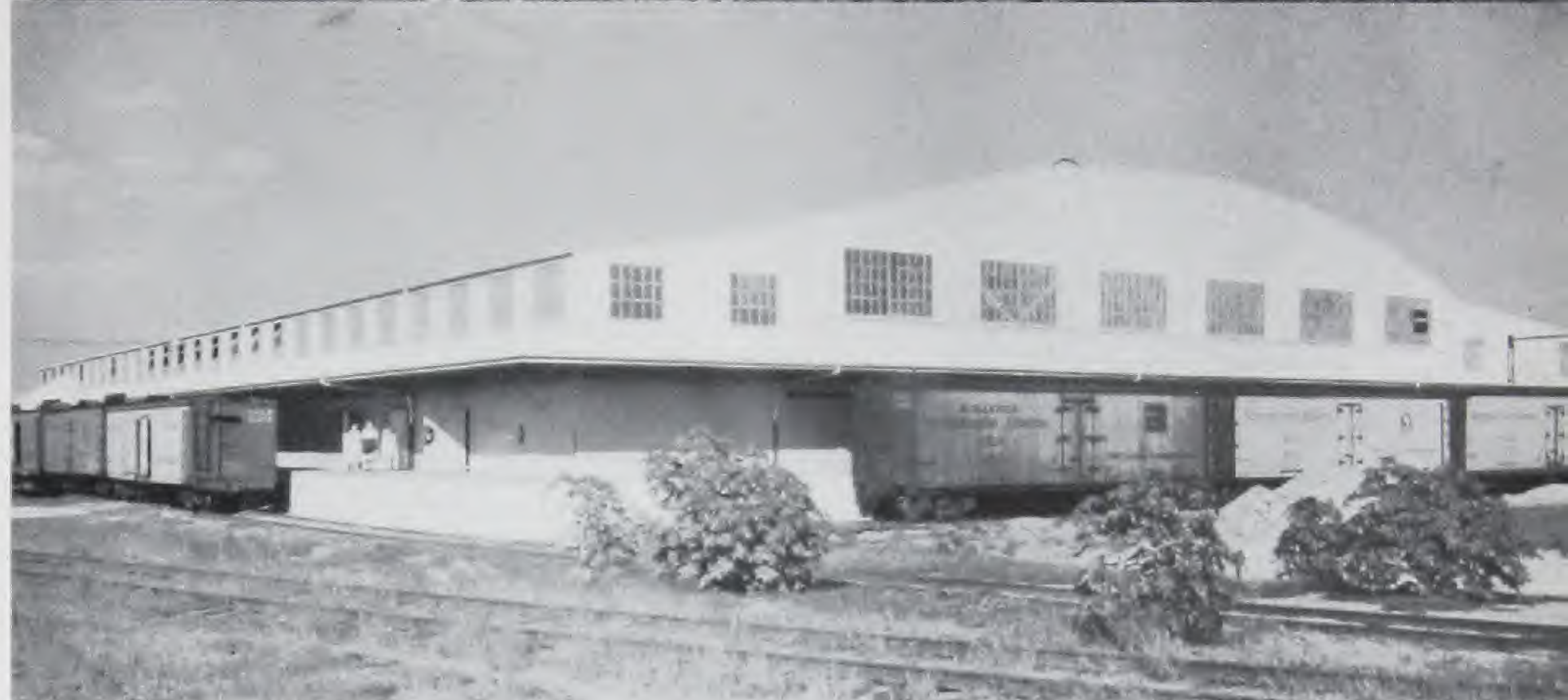
# Industrial Service

Toncan Iron Sheets were used for the ventilating and air-conditioning ducts of Crown Cork & Seal Co., Baltimore, Md. Architect, Lucius White; engineer, Henry Adams, Inc.; fabricator, Enterprise Sheet Metal Works, Inc. All are Baltimore firms.

All sheet metal work on the packing house of Lake Wales Citrus Growers' Association, Lake Wales, Fla., is of Toncan Iron. General contractor, G. A. Miller, Inc., of Tampa; fabricator, J. E. Swartz, Lake Wales.

In the Princeton Worsted Mill, Trenton, N. J., Toncan Iron Sheets and Pipe were used for dyeing room equipment. The company reports that its Toncan Iron rain-conductor has served for 15 years, whereas one of another material failed in 8 years.

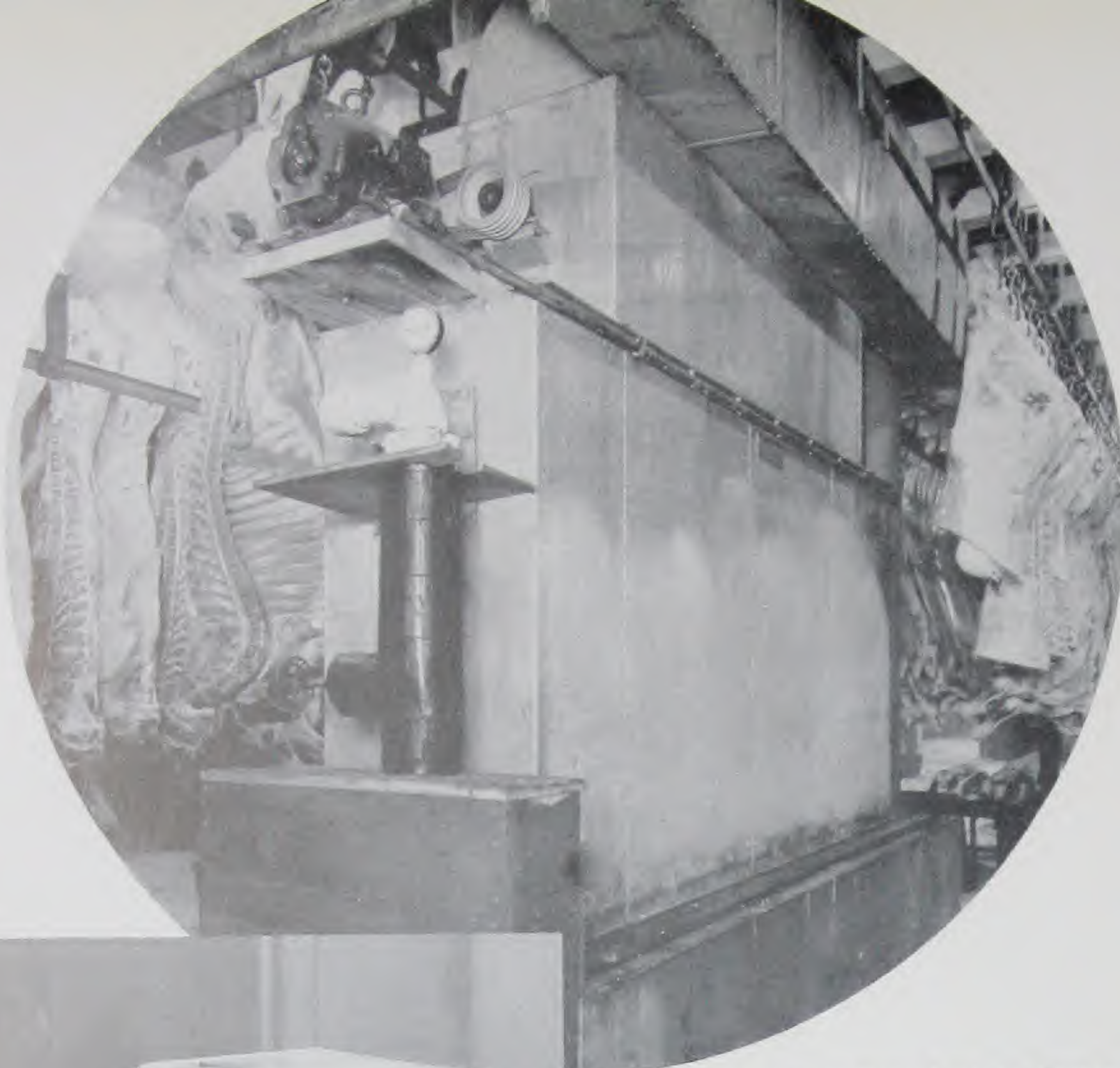
In their grain elevator at Buffalo, N. Y., Spencer Kellogg & Sons have made good use of Toncan Iron corrugated sheets. Schmahl Sheet Metal Works, Buffalo, was the fabricator.



Looking up at the 140-ft. smokestack which carries off kitchen fumes for Stouffers Restaurant, Cleveland. Fabricator: Cutter Sheet Metal Co., Cleveland.



# Air



For meat preservation, Laclede Packing Co., St. Louis, Mo., use a combination refrigeration and air-conditioning system. The engineers, R. H. Tait & Sons, used Toncan Iron Sheets for the all-welded housing, Toncan Iron Pipe for cooling coils.



The trunk system of the Lennox air-conditioning and heating system in the home of W. E. Blohm, Chicago, is made from Toncan Iron Sheets. Installation by A & A Furnace Co., Chicago.

Toncan Iron Sheets are used exclusively for the coal hopper in connection with the Electric Furnace-Man, an automatic anthracite burner manufactured by Electric Furnace-Man Inc., of New York City.

Toncan Iron was specified for this maze of air-conditioning and ventilating ducts in the Randall Island Administration Bldg., in connection with the Triborough Bridge, New York City. Fabricator, Consolidated Sheet Metal Works.



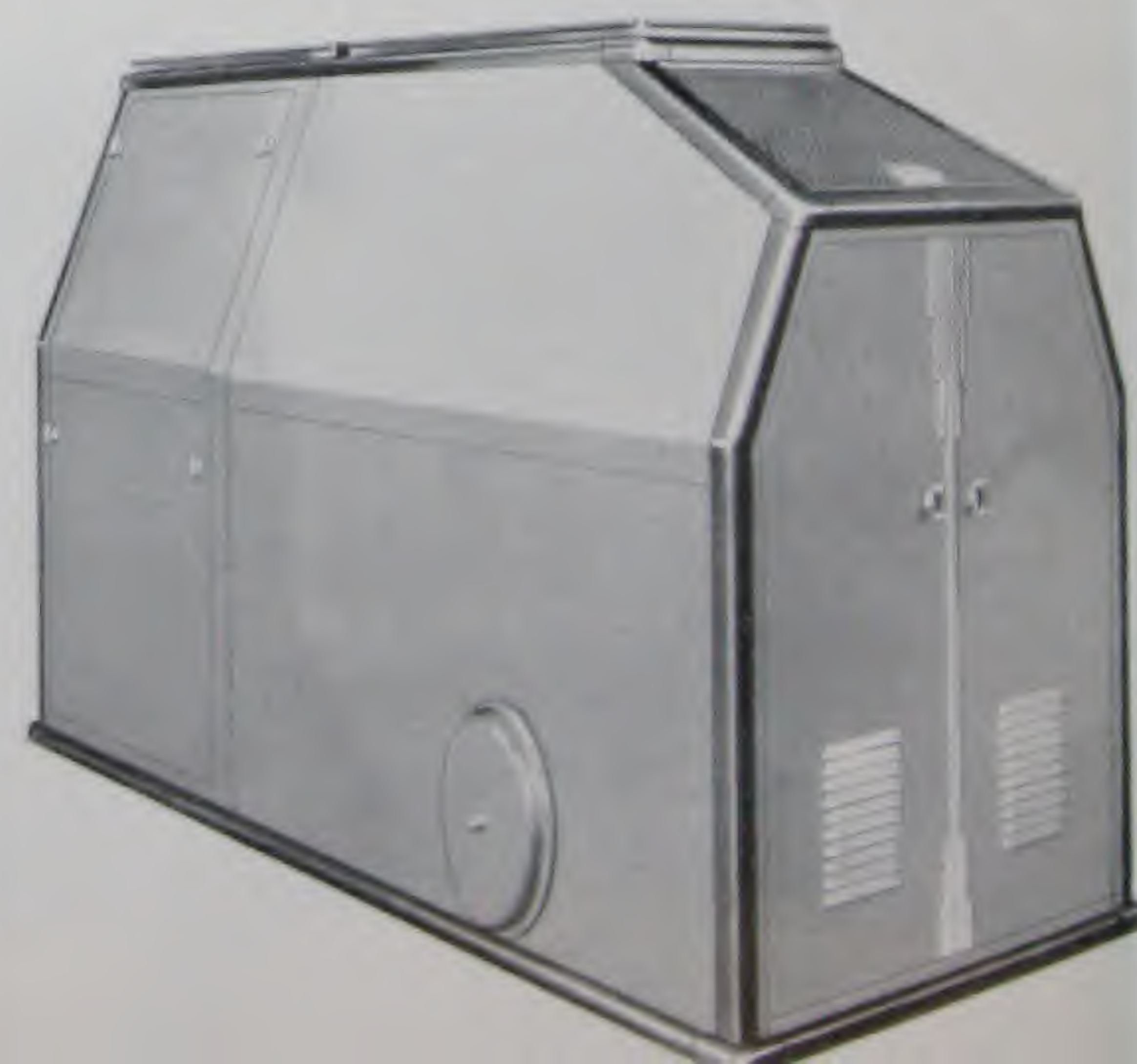
Vital parts of the economizer section of the Gar Wood Tempered-Aire systems are made from Toncan Iron. Otherwise the humidity of basements might create rust. The manufacturer of these units is Gar Wood Industries, Detroit, Mich.

• Toncan Iron Sheets for ducts and other sheet metal applications in air conditioning are establishing exceptional records for long life under severe conditions.

In the selection of ferrous materials for air-conditioning systems, there exists the ever-present problem of combating corrosion in (1) central station air-conditioning units and (2) ducts through which the conditioned air is carried to different parts of the building. Replacement of failed metal parts in air-conditioning installations is an extremely costly matter. Hence, insurance of maximum life for these parts is a fixed responsibility of the architect or engineer. The life of galvanized ferrous sheets in duct systems is affected by:

1. Moisture originally present in the air as water vapor, or as moisture held in mechanical suspension, deposits out on the sheet as a result of temperature changes.
2. Moisture deposits out in certain critical areas of the ducts, as a result of the circuitous, angular paths often necessary.
3. Moisture deposits out, as a result of the presence of dust particles or hygroscopic products of corrosion.
4. Improperly or insufficiently washed or filtered air contaminates the moisture with sulphurous acid, sulphuric acid, and hydrogen sulphide.

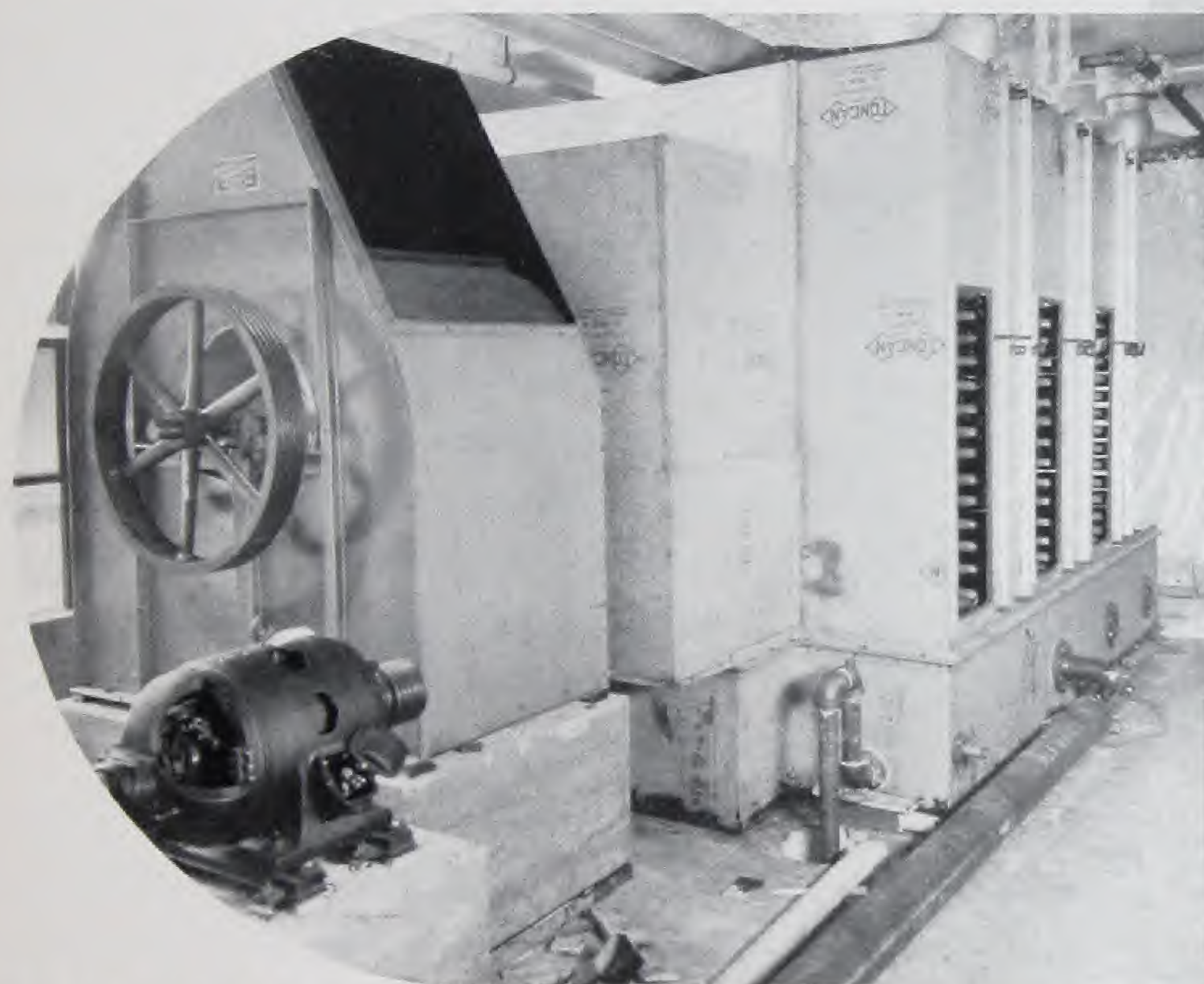
Toncan Iron has demonstrated its ability to prolong the life of air-conditioning equipment through its resistance to these corrosive conditions.





# Conditioning

*Heating · Ventilating  
Refrigerating*



The United Drug Co., St. Louis, Mo., well satisfied with the performance of Toncan Iron on a duplicate installation some years ago, specified it for the air-conditioning system of this new unit. Engineers, R. H. Tait & Sons, St. Louis, Mo.



Toncan Iron's reputation for air-conditioning and allied purposes has spread to Los Angeles, where Toncan Iron Sheets play their part in the ventilating system of the Auburn Cord Building. Fabricator, Newman Heating and Ventilating Co., Los Angeles.

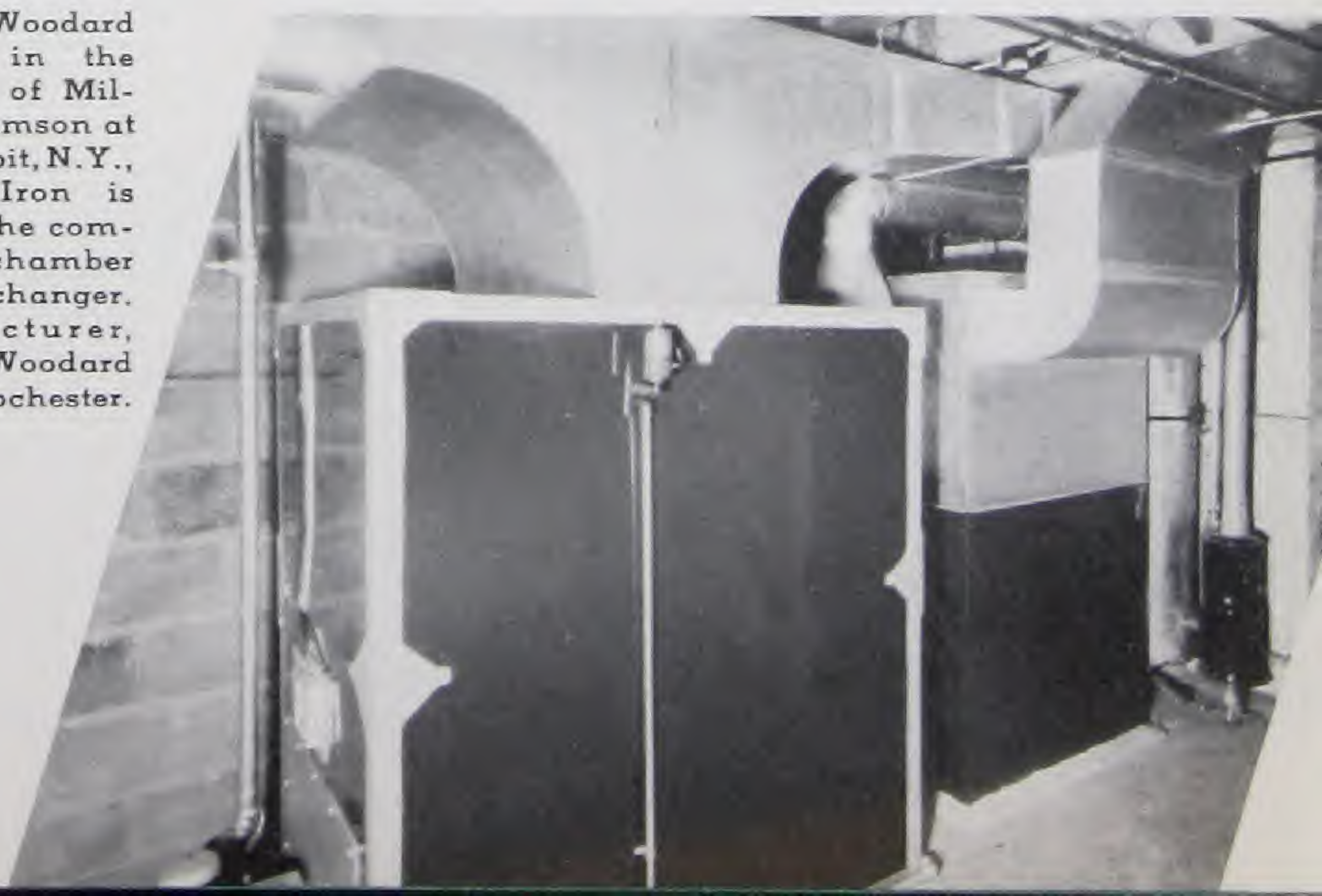


The presence of steam, moist air, and acid fumes is the reason for using Toncan Iron Sheets for the ventilators of the Terre Haute Paper Co., Terre Haute, Ind. Paul R. Jordan, of Indianapolis, was the fabricator.



Air-conditioning ducts, gutters, and downspouts in the new home of Moses King, Jr., Shaker Heights, Ohio, are made from Toncan Iron. Architect, John W. Little; general contractor, Anthony Lunardelli; subcontractor, Quiggan & Son. All are Cleveland firms.

For the Woodard Furnace in the residence of Milton Williamson at Irondequoit, N.Y., Toncan Iron is used for the combustion chamber and interchanger. Manufacturer, Thos. S. Woodard Co., of Rochester.





# Railroads

Many significant applications of Toncan Iron are to be found on and around railroads, where safeguards against the contaminated sulphurous products of combustion and condensation are necessary.

Roundhouse maintenance engineers successfully use Toncan Iron sheets for exhaust ducts. Toncan Iron plates have proven ideal for crossings and bridge decks, where corrosion from smoke, soot, brine drippings, etc. is liable to cause trouble. Locomotive fire-boxes represent another important application of Toncan Iron plates.

Continued, dependable service has established for Toncan Iron a recognition among its users as being one of the most satisfactory materials obtainable for railroad service.

"We are well pleased with the performance of Toncan Iron," writes the engineer inspecting the property of The Chicago Rapid Transit Co. This company, realizing that rust attacks coaches which must operate in all kinds of weather, 24 years ago specified Toncan Iron Sheets for the roofs of 250 cars. Toncan Iron has, for years, been used by The Chicago Rapid Transit Co. for maintenance work.

In the roundhouse of Norfolk & Western Ry. Co., Williamson, W. Va., the ducts which carry smoke from locomotives to the main pipe were lined with Toncan Iron. Furthermore, Toncan Iron Plates were used for five exhaust stacks.



Drippings from coal and refrigerator cars present a corrosion problem on bridge decks, which the Chicago, Milwaukee, St. Paul and Pacific Ry. Co. has solved by using Toncan Iron Plates. Fabricator, Vierling Steel Works, Chicago.



# ... Marine and Salt Water Atmosphere

• Salt water corrosion is based, primarily, upon the capacity of salt water to act as a conductor of the electrogalvanic currents set up when dissimilar metals, or metals containing oxide or slag inclusions, are subjected to it. Toncan Iron is able to combat this type of corrosion successfully because, unlike steel or the slag-containing irons, it is practically free from inclusions. It does not, therefore, permit the formation of thousands of destructive, galvanic cells.

For installations calling for the submersion of metal in salt water or for sea-board structures subjected to salt air atmosphere, Toncan Copper Molybdenum Iron consistently performs better than any ferrous material in its price class.



The tanks on the "Sportsman" model of the line of Fairform Flyers are of Toncan Iron Sheets. These boats are manufactured by Huckins Yacht Corp., Jacksonville, Fla.



The resistance of Toncan Iron to salt water atmosphere made it the ideal material to use for interior and exterior sheet metal work in the Atlantic City Convention Hall.



Bronx approach to Triborough Bridge, New York City. Toll stations, made from Toncan Iron Sheets, combat the salty atmosphere. Fabricator, Consolidated Sheet Metal Works.

• One of the many U. S. government lighthouses which safeguard marine transportation. Toncan Iron gutters and spouting are used here.



• Toncan Iron Sheets were used for the smokestack of S. S. Juanita of Great Lakes Transit Corp. Fabricator, Lake Erie Shipbuilding Co.; sub-contractor, Beals, McCarthy & Rogers, Inc.







# Farms . . .

Toncan Iron has established itself as the most practical and longest-lived roofing material for farms. Here is a view of Clover Hill Dairy, St. Marys, Pa., where Toncan Iron corrugated sheets have been used for roofing.

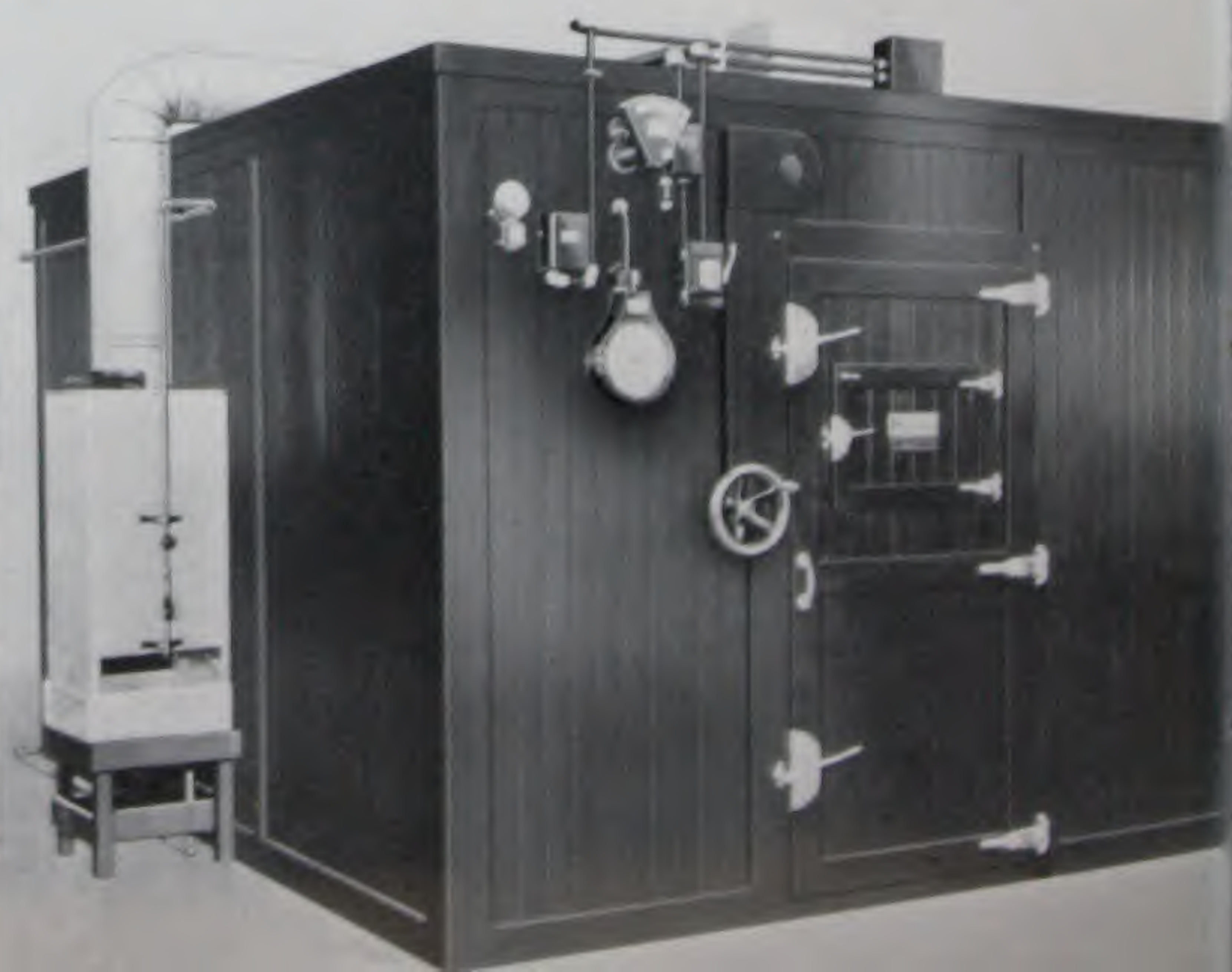


H. P. Squires, of Chesterville, Ohio, is a sheet metal contractor who has specialized in fine metal roofing for farms. The Beverly Farms Dairy is one of the many jobs on which he has used Toncan Iron exclusively.

Most metal parts of incubation equipment must withstand a constant moist atmosphere. Below is a Model 65 Smith incubator, having a capacity of 65,000 eggs. Air ducts and drip pans were fabricated from Toncan Iron. This line of incubators is manufactured by The Smith Incubator Co., Cleveland, Ohio.



"The Toncan Iron Sheets were of uniform quality, easy to work on the flashings, valleys, gutter, and conductor, as well as the standing seams," commented Herman Metz, sheet metal contractor, of Clinton, Ill., who installed the roofing of this barn on the C. H. Moore estate. (See page 20.)



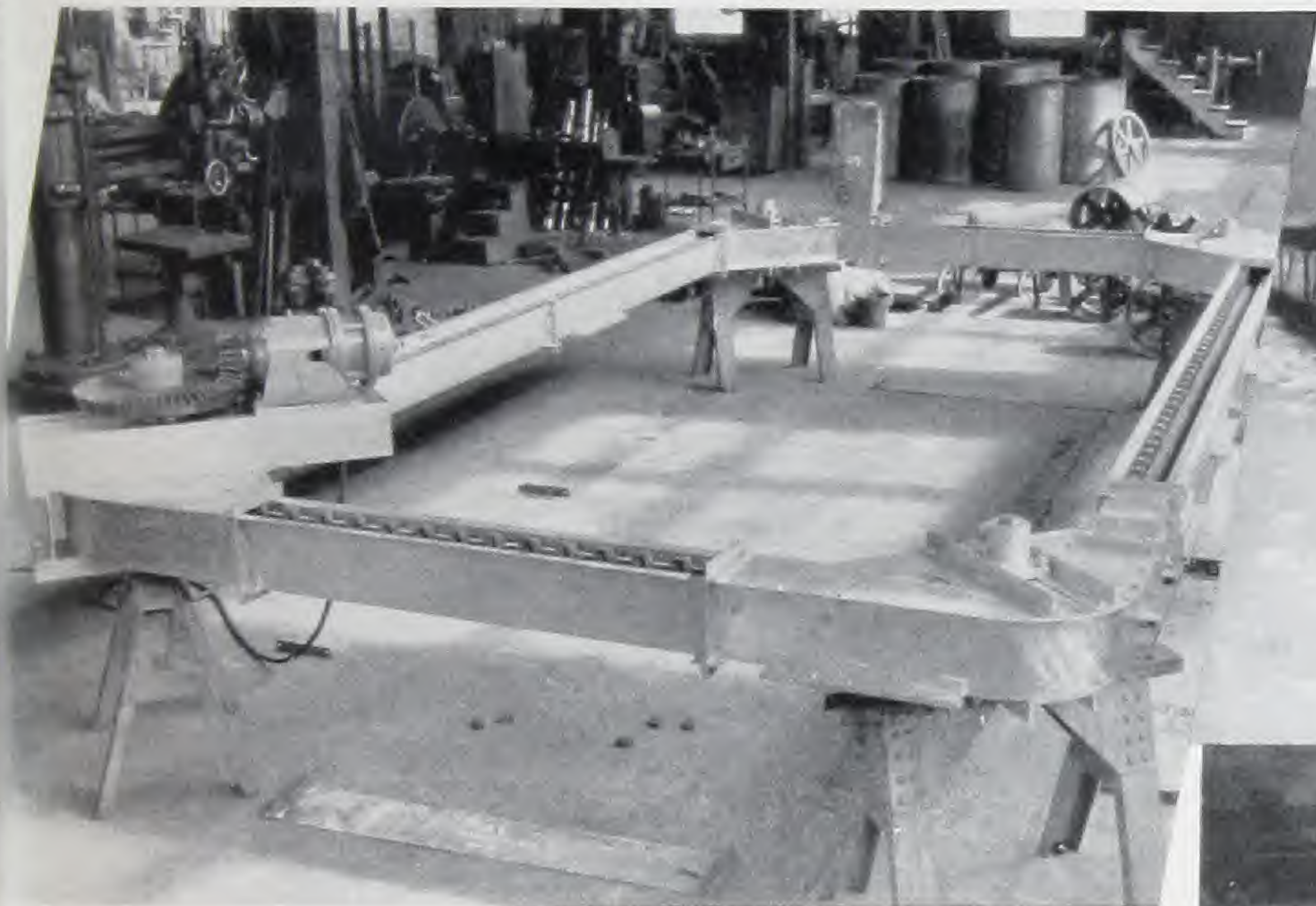
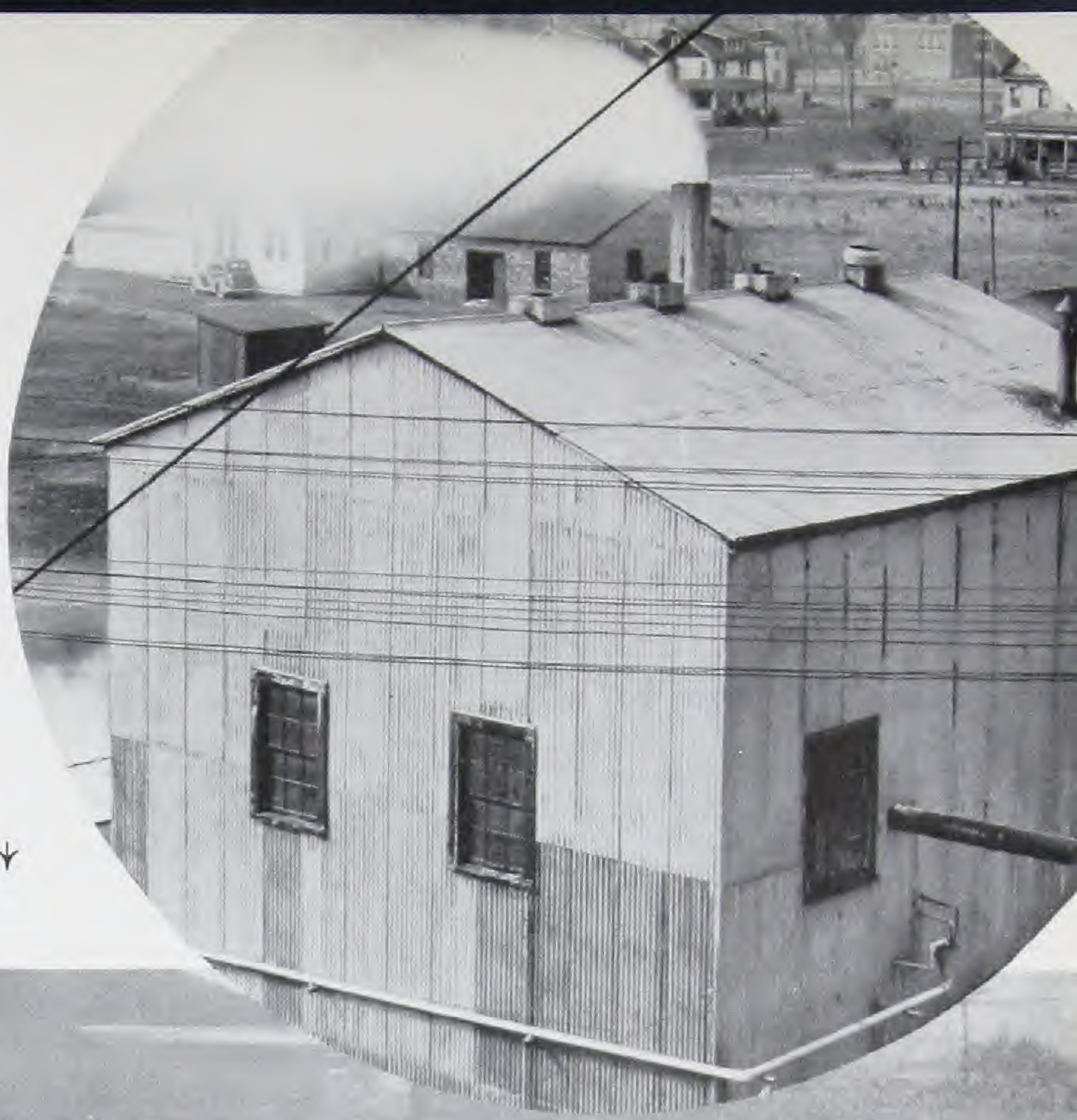


# Other Industries

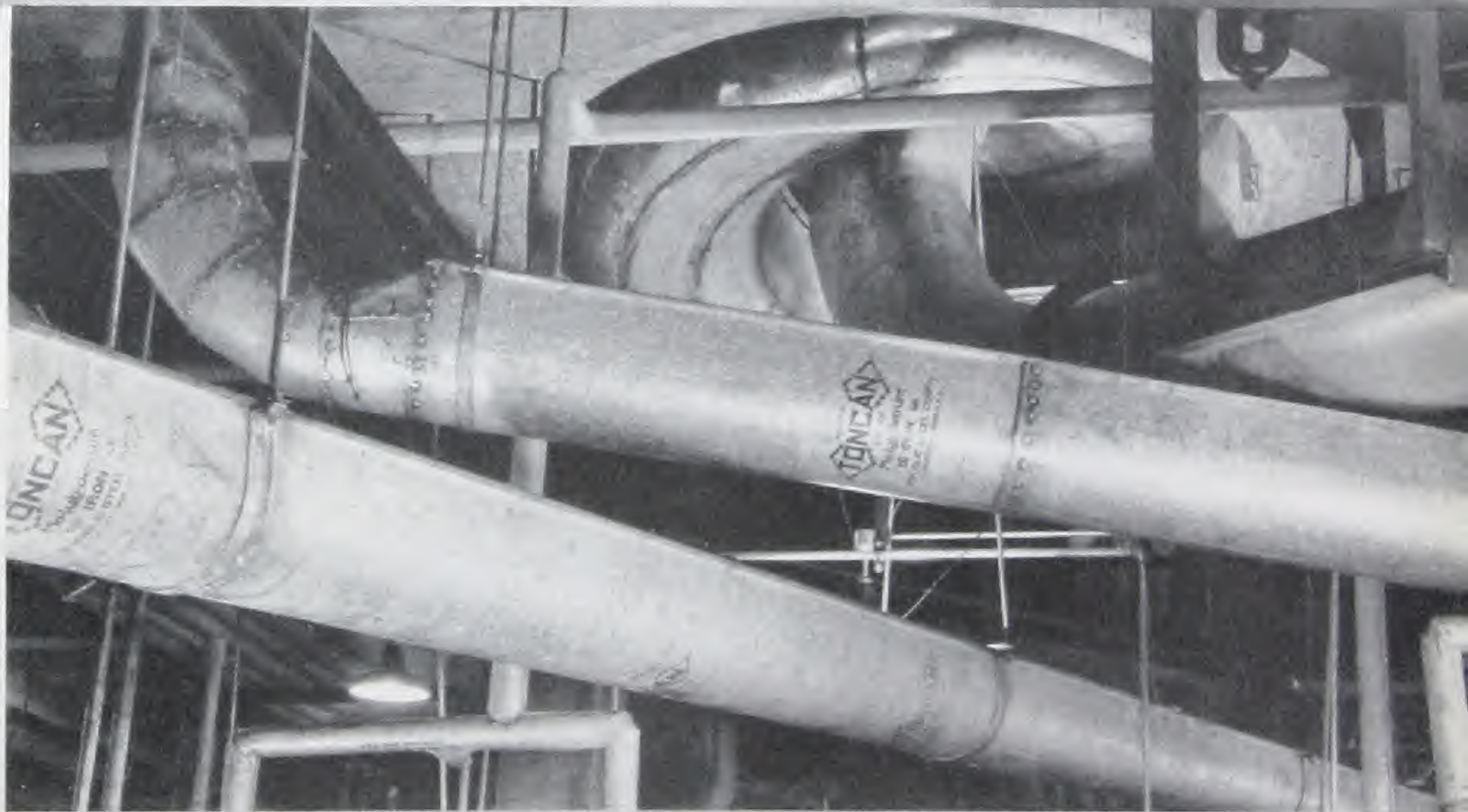
Salt air combined with sulphurous acid, steam temperatures up to 160° F., sulphuric acid mist are corrosion problems combated by Toncan Iron corrugated roofing and siding on this building of the Virginia Smelting Co., West Norfolk, Va.

A Redler conveyor in the plant of Carey Salt Co., Hutchinson, Kansas. Toncan Iron Sheets were used for the casing which encloses the conveyor. Stephens-Adamson Mfg., Aurora, Ill., manufacture Redler conveyors.

Irwin Foundry & Mine Car Co., Irwin and Shafton, Pa., use Toncan Iron Plates for hundreds of mine cars because Toncan Iron is superior in resisting the corrosive conditions of mines and mine waters. ↴



→  
Toncan Iron again contributes to the meat-packing industry. The "paunch chutes" shown here were manufactured by Zack Co., Chicago, and are used in the plant of Armour & Co. The Toncan Iron trade-mark is visible on the chutes.



In the air-conditioning system of the Whitney Bank Bldg., New Orleans, La., all exposed ducts are of Toncan Iron. Consulting Engineers, Weil & Moses; general contractor and fabricator, Carrier Engineering Corp.



Toncan Iron Sheets line the interior of the storage compartments of this McCray refrigerator. Toncan Iron Enameling Stock has been used for all porcelain-enamelled parts. The unit is manufactured by McCray Refrigerator Sales Corp., Kendallville, Ind.

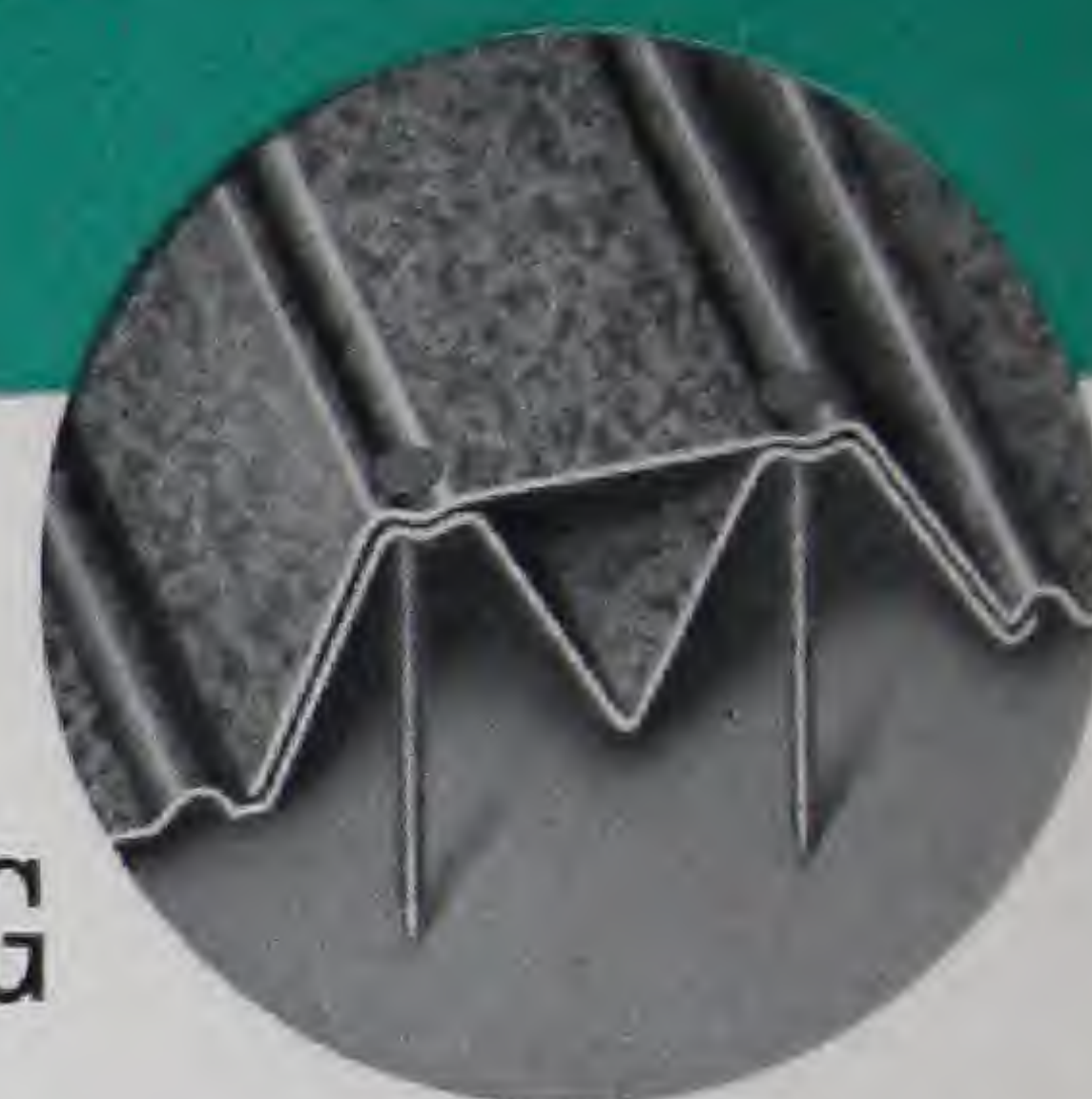


# TONCAN IRON FORMED ROOFING PRODUCTS

• Regardless of whether you buy ordinary metal roofing products or Toncan Iron Roofing Products, several of the larger items that make up the final cost remain the same. As examples, consider the cost to the manufacturer of forming the sheets, the cost of shipping them to you, and the labor cost of applying them to the building. The only added cost for products made from famous Toncan Iron is a small one.

So why not use Toncan Iron Formed Roofing Products? They can be depended upon to outlast those from ordinary metal by many years. They resist rust and corrosion longer.

Write for additional information on Republic's wide range of Toncan Iron Formed Roofing Products.



Here is Republic's New

## TRIPLE-DRAIN ROOFING

• In this new "triple-drain" galvanized roofing, Republic engineers have developed a totally new type drain channel that makes leaks impossible. Not a single channel. Not a double channel. There are actually three channels. Just a glance at the illustration will tell you that neither driving rain, nor capillary attraction (syphoning or seepage) can cause leaks with this vastly improved design. Wind-driven rain must climb over three "valleys" and four "ridges." Made in gauges 26, 28, and 29. Lengths: 5, 6, 7, 8, 9, 10, 11, and 12 feet. Covering width, 24 inches. Write today for complete information on Triple-Drain, Republic's new, revolutionary roofing.

### EAVES TROUGH



Single bead slip joint



Double bead slip joint

Well made for long service, heavily galvanized. Single or double bead; lap or slip joint. Lengths, 10 feet; gauges, 28, 26, and 24; sizes, 3, 3½, 4, 5, 6, and 7 inches. Also miters, ends drops, and other accessories.

### RIDGE ROLL



Plain

Made with or without nailing flange; lengths, 10 feet. Size of rolls, 1¼, 1½, 2, 2½, and 3 inches. Size of aprons, 1¼, 2, 2½, 3, and 3½ inches. Girths, 7, 8, 10, 12, and 14 inches. Gauges, 29 and 26.



Corrugated

Used with corrugated roofing. Length, 28 and 96 inches. Made with 2½-inch or 1¼-inch corrugations with 2-inch roll; 4-inch apron; 12-inch girth.

### CONDUCTOR PIPE

Carefully and accurately made; round and square corrugated and round plain styles; lengths, 10 feet; gauges, 28, 26, and 24; sizes, 2, 3, 4, 5, and 6 inches. Also elbows, shoes drops, and other accessories.



Plain Round Pipe



Round Corrugated Pipe



Square Corrugated Pipe

## SPECIAL FORMS OF TONCAN IRON SIDING

• For siding on business blocks, garages, theatres, factory buildings, etc., these special forms offer a very attractive appearance, plus the permanence of Toncan Iron. Lightest gauges, 28 galvanized and 26 black or painted.

**WEATHERBOARD SIDING**—Covering width, 24 inches. Each sheet shows six boards 4 inches wide. Lengths: 5, 6, 7, 8, 9, and 10 feet. Used extensively on frame buildings.

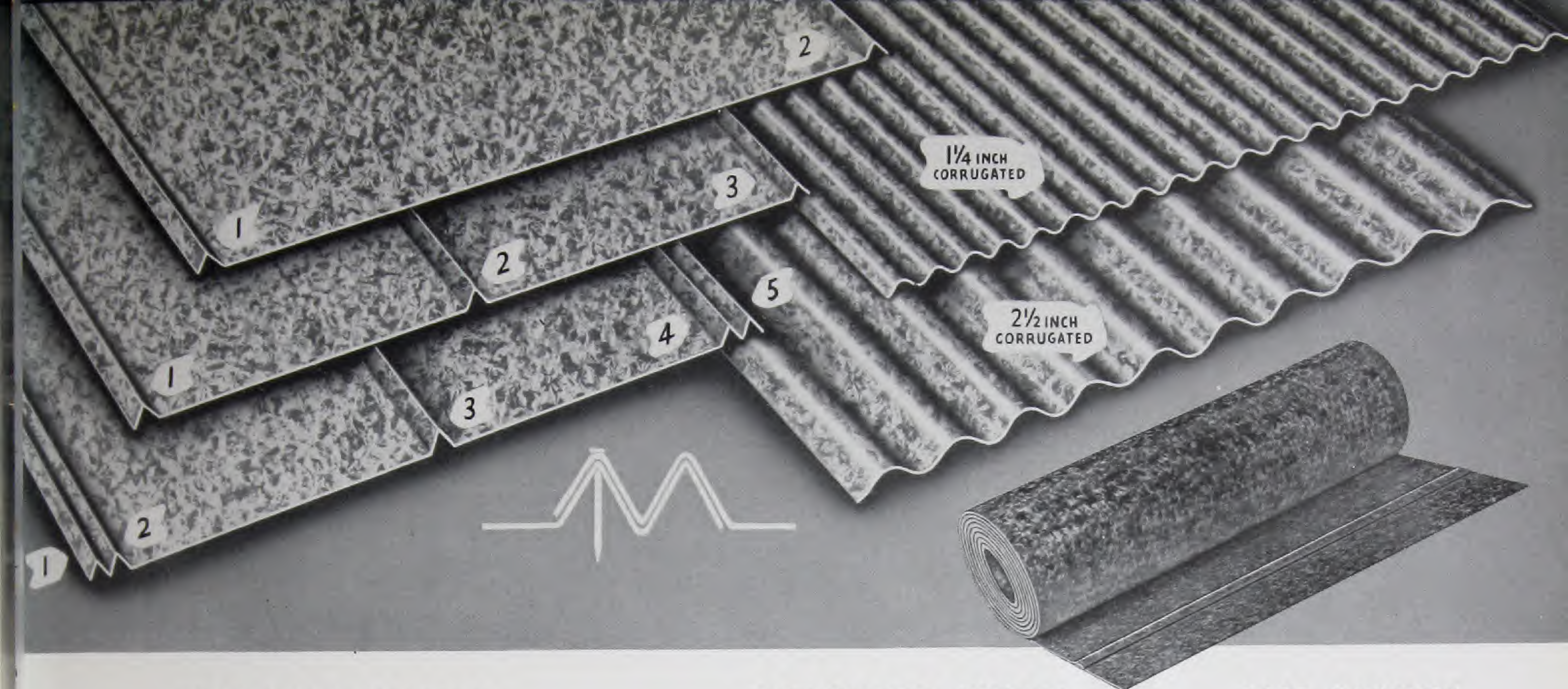


**PRESSED BRICK SIDING**—Sheets, 28 x 60 inches. Size of single bricks, 2 4/5 x 8 1/4 inches. Rock-faced brick siding also is available. Sheets, 28 x 60 inches. Size of single bricks, 2 4/5 x 8 1/4 inches.



**ROCK-FACED STONE SIDING**—Sheets, 28 x 60 inches. One square consists of 8 4/7 sheets. No. 1: size of single stone, 7 x 12 inches. No. 2: size of single stone, 9 1/3 x 20 inches.





## V-CRIMPED ROOFING

- V crimped is the oldest form of roofing, and has been used extensively. The construction is simple and makes a good appearance at reasonable cost. This roof can be applied over close sheathing, to strips spaced four or five inches apart or over old shingles. The 3V-crimped is a pleasing variation from the standard and makes a stiffer sheet, while 5V-crimped is still stronger. All three styles are supplied in lengths of 5, 6, 7, 8, 9, 10, 11, and 12 feet and in gauges 24 and lighter. Actual covering width of each style is 24 inches.

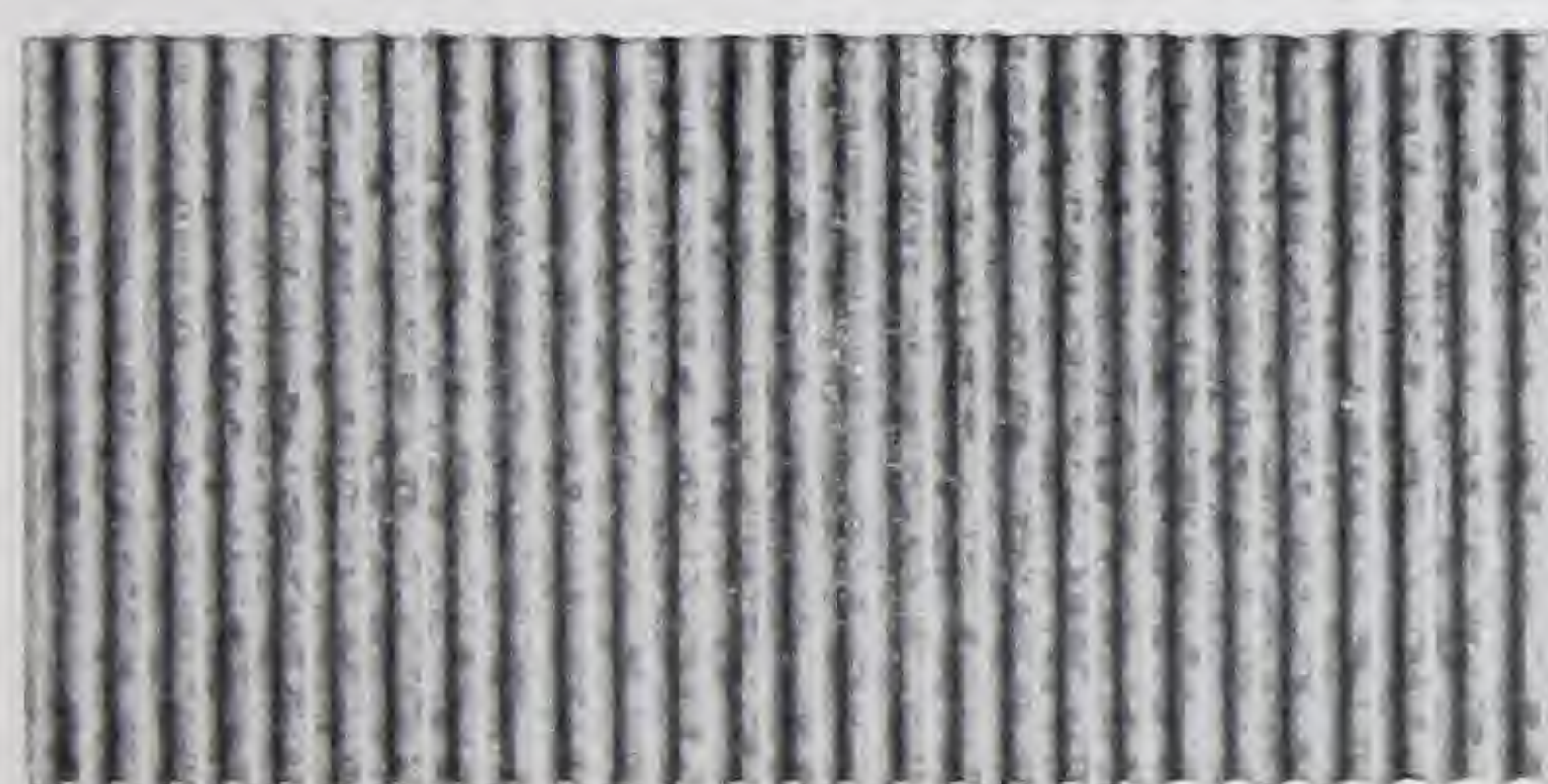
## CORRUGATED SHEETS

- Corrugated sheets offer the advantage of light weight with great lineal rigidity. This advantage, plus the fire protection offered by corrugated sheets, accounts for their almost universal use in roofing and siding for industrial buildings, warehouses, mine buildings, and other large structures in the vicinity of railroads. Corrugated sheets are also an ideal material for barns, garages, sheds, and a wide variety of other buildings. The 1 1/4-inch style is supplied in gauges 20 and lighter; the 2 1/2-inch style in gauges 10 and lighter. Both styles are 26 or 27 1/2 inches wide; lengths, 5, 6, 7, 8, 9, 10, 11, and 12 feet.

## ROLL ROOFING

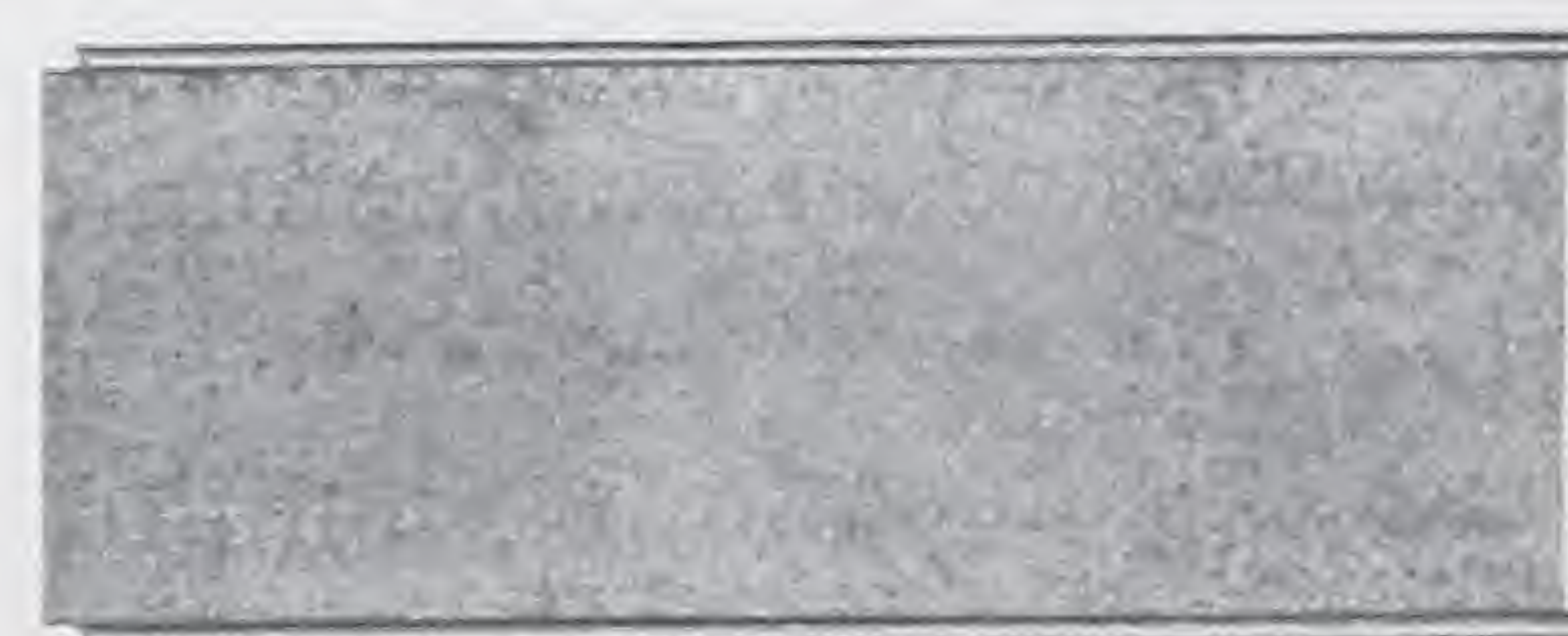
- Especially useful where pitch of roof is slight and for wide areas. Cross seams are double locked. Each roll contains 50 lineal feet. Covering width is 24 inches. Gauges 26, 28, and 29.

## CROSS-CORRUGATED SHEETS



- Used for elevators and other high buildings where there is some motion of the building in the wind or where the structure may settle. The nails in each sheet are driven 2 inches above the edge of the sheet below, which allows the building to settle or move without loosening the sheets. The standard size for this type of sheet is 26 x 32 inches, providing for a covering width of 24 inches, with a 2 inch lap.

## PRESSED STANDING SEAM ROOFING



- Strong and attractive, this is one of the most perfectly watertight of all metal roofings when properly applied, as no nails are driven through the roofing sheets. Covering width, 24 inches. Lengths, 5, 6, 7, 8, 9, 10, 11, and 12 feet. Galvanized; gauges 28, 26, and 24. Painted; gauges 26 and 24.

## TONCAN IRON PIPE



- Toncan Copper Molybdenum Iron Pipe brings to industry an alloy iron pipe highly resistant to the attack of rust and corrosion, with extreme ductility and workability. It not only has proved far superior in accelerated tests, which have been corroborated in actual service, but also has proved its longevity of cost-saving, trouble-free life in severe corrosive service. Write for the book, "Toncan Iron Pipe for Permanence."



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